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IS 13255 (1992): Adhesive-Liquid-for use on high speed flap gumming and embossed envelope machines [PCD 12: Plastics]

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असंजक — द्रव — उच्च गति फ्लैप गोंदन (गोंद लगाने) और लिफाफा समुद भारण की मशीनों में प्रयुक्त होने वाला द्रव आसंजक – विशिष्टि

Indian Standard

ADHESIVE — LIQUID — FOR USE ON HIGH SPEED FLAP GUMMING AND EMBOSSED ENVELOPE MACHINES — SPECIFICATION

UDC 665·936 : 676·822·057

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NEW DELHI 110002

January 1992

Price Group 2

Adhesives Sectional Committee, PCD 15

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Adhesives Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

This standard covers requirements and methods of sampling and test for synthetic remoistenable liquid adhesives which are used on high speed flap gumming and embossed envelope automatic machines. These machines operate at a speed of 154 metres (500 feet) reel of inland paper per minute wherein the adhesive applied is dried through radio frequency dryer instantaneously.

The physico-chemical requirements of the liquid adhesive prescribed in this standard have been generated after analysing number of adhesives samples which had successfully performed on these machines. The liquid adhesive may be dextrin based or synthetic adhesive like polyvinyl acetate, polyvinyl alcohol with suitable additives to achieve the desired characteristics.

While no specific requirements have been laid down for insect repellency and toxicity, and the effects of these adhesives on paper. It is recommended that the material should be insect repellent and should have neither bleaching nor deepening effect on the colour of the paper on which it is used. It would be the responsibility of the manufacturer to ensure that the material is non-toxic, so that on the off chance, the unhealthy practice of sticking the gummed flaps by direct application of saliva through tongue, does not cause any adverse effect.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

ADHESIVE — LIQUID — FOR USE ON HIGH SPEED FLAP GUMMING AND EMBOSSED ENVELOPE MACHINES — SPECIFICATION

1 SCOPE

This standard prescribes requirements and methods of sampling and test for liquid adhesive used for letters flap gumming and manufacturing of inland covers, envelopes, etc, by high speed automatic gumming machine.

2 REQUIREMENTS

2.1 Description

The liquid adhesive shall be uniform in consistency and free from lumps, dirt, fillers, pigments and other suspended matter. The material shall be translucent, white to light yellow or light brown in colour. The liquid adhesive and its dry film shall be free from objectionable odour.

2.2 The liquid adhesive shall be ready for use on machines. It may be diluted with water, if desirable, and the diluted adhesive shall not show any signs of deterioration for at least seven days. The adhesive shall give glossy translucent, non-hygroscopic and remoistenable film when the same is applied through the machine. The material shall not form scales when opened to atmosphere for 5 hours.

2.3 Trial Test

The liquid adhesive film on the flap shall be capable of being applied smoothly by machines and shall completely dry (tack free) at a speed of 200 cm/s. The adhesive shall not create any working problem on winding and collecting on knurling rollers.

2.4 The material when tested according to the methods prescribed in Annex A shall comply with the requirements given in Table 1. Reference to the relevant clauses of Annex A are given in col 4 of the Table 1.

2.5 Keeping Quality

The material when stored in original closed containers for a minimum period of one year from the date of manufacture shall satisfy all the requirements given in **2.1** to **2.4**.

Table 1 Requirements for Adhesive Liquid for Use on High Speed Flap Gumming and Embossed Envelope Machines

(*Clause* 2.4)

Sl No.	Characteristic	Requirement	Method of Test, Ref to Cl No. in Annex A
(1)	(2)	(3)	(4)
i)	Total solids, percent by mass *Min*	50	A-1
ii)	Viscosity, mPa s	2 000 to 3 500	A-2
iii)	*p*H	5 to 8	A-3
iv)	Adhesion strength	To pass the test	A-4
v)	Brittleness and antiblocking	To pass the test	A-5
vi)	Abrasion resistance	To pass the test	A-6
vii)	Non-curling	To pass the test	A-7
viii)	Rewettability	To pass the test	A-8
ix)	Stability	To pass the test	A-9

3 PACKING AND MARKING

3.1 Packing

The material shall be packed in clean, dry poylethylene bags or in suitable carboys or packed in rust free leak proof drums. Generally 50 to 55 kg is packed in a adhesive drum. Alternate packing may be used as agreed to between the purchaser and the supplier.

3.2 Marking

Each container shall be legibly marked with the following informations:

a) Name of the material;
b) Indication of the source of manufacture;
c) Date of manufacture;
d) Volume of the material;
e) Directions for storage and use, if necessary; and
f) Batch number/Code number.

4 SAMPLING

4.1 The scale of sampling and criteria for conformity of the material shall be as prescribed in Annex B.

ANNEX A

(*Table* 1)

METHODS OF TEST FOR LIQUID ADHESIVE FOR USE ON HIGH SPEED FLAP GUMMING AND EMBOSSED ENVELOPE MACHINES

A-1 DETERMINATION OF TOTAL SOLID

A-1.1 Procedure

Take about 5 g of the material, accurately weighed, in a porcelain basin of 7·5 cm diameter and evaporate to near dryness on a water-bath. Then remove the basin to an air oven maintained at 105 ± 2°C. Cool in a desiccator and weigh. Repeat the operation till constant mass is obtained.

A-1.2 Calculation

$$\text{Total solids, percent by mass} = \frac{100\,M_2}{M_1}$$

where

M_2 = mass, in g, of the residue; and

M_1 = mass, in g, of the material taken for the test.

A-2 DETERMINATION OF VISCOSITY

A-2.0 General

Information on viscosity is usually required to ensure that the adhesive has correct flow characteristics in use.

A-2.1 Procedure

Fill the compound in a 250-ml beaker taking care that it remains free from air bubles, with the use of a viscometer such as Brookfield RVT model, determine viscosity of the material using spindle No. 2 and 4 at 27 ± 2°C. Other viscometers may also be used provided they have been calibrated against Brookfield viscometer. A minimum of five readings shall be taken within 15 minutes and at a fixed speed of 20 rev/min (RPM) on the viscometer. The average of these readings may be reported in millipascal seconds.

A-3 DETERMINATION of *p*H

A-3.1 Procedure

Weigh about 10 g of adhesive, add distilled water to make up the volume to 100 ml and determine *p*H value of the solution at a temperature of 27°C within an accuracy of 0·1 *p*H units. The use of a potentiometer with glass electrode or any suitable *p*H meter is advised. If any other method is used for determination of *p*H value it shall be as agreed to between the purchaser and the supplier.

A-4 TEST FOR ADHESION STRENGTH

A-4.1 Procedure

Take six pieces of paper of 60 gsm of size 5 cm × 6 cm of each of (a) offset cartridge paper, (b) machine glazed paper, (c) machine finished printing paper, and (d) kraft paper (*see* Note). Mark off with a pencil or by folding, a strip one centimetre wide leaving an area 5 cm². Pour about 10 mg of the adhesive to be tested on the paper (on the glazed side in the case of machine glazed paper) and spread it evenly over the 25 cm² area with a squeeze, spatula or similar non-absorbent implement, leaving an ungummed flab one centimetre wide. Stick the pieces on to a larger piece of (a) the same paper, (b) straw board, (c) packing case wood, (d) jaconet cloth (or *MALMAL*), and (e) pane glass. Keep the specimens at a temperature of 27 ± 1°C and relative humidity of 65 ± 5 percent for one hour. Test by gripping the free one centimetre wide flab and pulling the piece apart with a steady pull.

NOTE — The paper used for determination of adhesion strength shall be of 60 gsm with the following tolerances:

a) For cartridge paper, machine glazed paper and machine finished printing paper, the actual substance shall not differ by more than ± 2·5 percent.

b) For kraft paper, the actual substance shall not differ by more than ± 5·0 percent.

A-4.2 The material shall be taken to have passed the test if each piece tears during stripping, leaving the fibres still attached over at least 50 percent of the original area of attachment.

A-5 TEST FOR BRITTLENESS AND ANTIBLOCKING

A-5.1 Procedure

Take 50 mg of the adhesive, and spread it evenly on kraft paper, 2·5 cm × 10 cm in size. Keep it at a temperature of 27 ± 2°C and relative humidity of 65 ± 5 percent and applying pressure of 2 kg/cm² for one hour. Roll the paper on a wooden office roll of 2·5 cm diameter, first with the coated side up and next with the coated side down.

A-5.2 The total number of sheets to be tested at a time is 5 and the material is taken to have passed the test if film and the paper do not show any sign of cracking and the paper does not get stuck to the roll in each case.

A-6 TEST FOR ABRASION RESISTANCE

A-6.1 Procedure

Take 100 mg of the adhesive, make a uniform film on kraft paper, 2·5 cm × 10 cm in size and allow it to dry for an hour in open at room, temperature. After drying, moisten the gummed surface with gentle abrasion using wet cotton.

A-6.2 The total number of sheets to be tested at a time is 5 and the material shall be taken to have passed the test if in each case adhesive film does not fully/partially come out.

A-7 TEST FOR NON-CURLING

A-7.1 Procedure

Take five pieces of size 5 cm × 10 cm of each of (a) offset cartridge paper, (b) machine glazed paper, (c) machine finished printing paper, and (d) kraft paper. Mark off with a pencil or by folding a strip of size 2·50 cm × 10 cm. Apply 100 mg of the adhesive on 2·5 cm × 10 cm area of each of these pieces. Dry the films in open at room temperature for one hour and after drying keep them at a temperature range 20°C to 40°C, 65 ± 5 percent relative humidity and a uniform pressure of 2 kg/cm^2, for two hours. Release the pressure and observe the effect of curling after 10 minutes.

A-7.2 The material shall be taken to have passed the test if the test pieces lay flat.

A-8 TEST FOR REWETTABILITY

A-8.1 Procedure

Take one test piece each of (a) offset cartridge paper, (b) machine glazed paper, (c) machine finished printing paper, and (d) kraft paper, after testing them for non-curling as prescribed under **A-7.1** Remoisten each test piece gently with wet cotton and observe the adhesion strength of the film as given in **A-4**.

A-9 TEST FOR STABILITY

A-9.1 Procedure

Take 10 g of the material in a petri dish of 100 mm diameter. Cover the dish and keep it in an incubator maintained at a temperature of 37 ± 1°C for 14 days and relative humidity of 65 ± 5 percent.

A-9.2 The material shall be taken to have passed the test if there is no fungus growth separation or sedimentation. The material shall also pass the test for adhesion strength given in **A-4**.

ANNEX B

(*Clause* 1.4)

SAMPLING OF ADHESIVE FOR USE ON HIGH SPEED MACHINES

B-1 LOT

All containers in a single consignment containing material of the same type and belonging to same batch of manufacture shall constitute a lot.

B-1.1 For ascertaining conformity of the material in a lot to the specified requirements, sampling and testing shall be done for each lot separately.

B-1.2 The number of containers to be selected randomly for inspection from a lot shall depend upon the size of the lot and shall be in accordance with col 1 and 2 of Table 2. For random selection, methods as given in IS 4905 : 1968 shall be followed.

Table 2 Scale of Sampling

No. of Containers in the Lot (1)	No. of Containers in Sample (2)
Up to 100	2
101 to 300	3
301 to 1 000	5
1 001 to 2 000	7
2 001 and above	10

B-1.3 The containers selected as in **4.1.2** shall be tested for trial test (*see* **2.3**).

B-1.4 From each selected containers representative portion of material sufficient to carry out triplicate determination of all characteristics shall be taken.

B-1.5 Composite Sample

Out of three portions, a small but equal quantity of material shall be taken and mixed thoroughly to form a composite sample. The composite sample shall be divided into three equal parts, one for the purchaser, another for the supplier and the third for use as a referee sample. Each part should be sufficient for the tests required to be made on the composite sample.

B-1.6 Number of Tests

Test for trial shall be made on each container selected as per col 1 and 2 or Table 2 while tests for all other characteristics shall be made on the composite sample (*see* **B-1.5**).

B-1.7 Criteria for Conformity

B-1.7.1 Each container subjected to trial test shall satisfy the requirements of trial test for the lot to be deemed as satisfactory for carrying out tests for other characteristics.

B-1.7.2 In respect of each characteristic tested for on composite sample, the lot shall be declared to meet the requirement if the test result on the composite sample satisfies the corresponding requirements.

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